

## *Distribution System Theory and Operations*

### **Abstracts**

#### *Pressure Zone Anatomy*

Viewing a water system's distribution pressure zones through the lens of the hydraulic grade line can support an operator's overall system management in several ways: interpreting field pressures, identifying distribution bottlenecks, establishing PRV settings, and determining short and long-term solutions to operating issues. System improvements that balance the hydraulic grade across a zone can reduce reliance on PRV supply from pumped zones, maintain adequate water levels of distant reservoirs, and support your overall supply and storage strategy. This presentation will use examples from utilities to cover how the hydraulic grade of a pressure zone is set, how to balance the hydraulic grade across a zone, and how to use your hydraulic profile and hydraulic modelers to support field operations.

#### *Considerations for operation of drinking water reservoir levels*

This presentation will provide background information on drinking water reservoir storage volume allocation components of water levels as they pertain to system pressure, fire suppression, and maintenance of good water quality.

#### *Pumps and Pumping*

This presentation will provide an operational focus on the different styles and types of pumps used in the water industry today, covering commonalities, differences and capability. It will also cover determination of pump performance requirements, including calculation of total dynamic head, water horsepower, and application of pump curve calculations.

#### *Understanding Control Valves*

This presentation will take a fundamental look at how hydraulic control valves operate and review their overall role in the water distribution system. Pressure reducing, pressure relief, level control and surge control amongst the many functions that control valves offer to protect and manage system pressure & flow rates. Attendees will leave with a clear understanding of why certain valves are used in particular applications while being able to identify key components and features.

#### *When Things Go Wrong*

What happens when things don't run smoothly? Based on years of first hand experience as a field operator and a supervisor, this presentation will discuss more common events. Issues that will be explored include pump failure, combination or air release valve failure, water hammer issues. Potential outcomes including effects on water reservoirs, water quality issues, boil water notifications, and potential property damage will be discussed.

#### *Tualatin Valley Water District's Approach to Distribution System Resiliency*

There are many events which could cause disruption to water service. These can range from minor repair work to major catastrophic events such as a Cascadia Subduction Zone earthquake. It is important to reduce impact to customers during routine work and day to day operations, including leak repairs, pipeline replacements, or other items. Tualatin Valley Water District (TVWD) has planned for these events by building resiliency through redundancy. This presentation will discuss TVWD's approach to master planning within the distribution system, and how a resilient system has helped to overcome potential impacts to customers.

### *Changing the System Through Rezoning*

Growth or aging in water systems, as well as change in expected level of service, may require utilities to rezone their water pressure zones. Rezoning may include increases or decreases the existing pressures (potentially requiring changes in infrastructure to support the new pressure), or may acknowledge pressure changes that have already been made but not documented. The presentation will review the reasons to rezone, common components of a rezone, and analysis tools for Utilities to apply when implementing a rezone. The presentation will be applicable for operators, engineers, and Utility managers.